LETTERS TO A MOTHER,

FROM A MOTHER,

ON THE

FORMATION, GROWTH,

AND

CARE OF THE TEETH.

BY

THE WIFE OF A DENTIST,

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PRIVATE EDITION. PUBLISHED BY PERMISSION BY
H. M. AND H. E. RAGON.
BATH, MAINE.
1889.

PRESS OF C. W. CALKINS & CO., 52 PURCHASE STREET BOSTON.

INTRODUCTION.

No child should be allowed to have a decayed tooth (sufficiently so to ache), and no mother should be allowed to remain in ignorance of the means by which this result can in a majority of cases be secured.

Naturally anxious for the best welfare of her child, physically as well as mentally and morally, well-meant advice, kindly proffered, couched in proper terms, coming from a competent source, will never be rejected by any sensible mother.

If proper advice were given every prospective mother regarding the care of herself, especially in regard to furnishing abundance of proper nutrient elements, "bone and tooth food," from the very hour of conception, children would be born with the tooth-germs so well nourished during fœtal life that they would erupt at the proper time with little or no disturbance, and they would be of such fine structure that but little care beyond strict cleanliness and proper diet would be required to keep them sound and perfect.

To attain this most desirable end, however, mothers must be taught how much depends upon their own efforts, rightly guided by the wise in-

structions of those made competent to guide and instruct by a lifetime of research and study.

Teach mothers that the teeth are not formed, as so many evidently suppose, during the few weeks or months preceding eruption, when the gums are swollen, and the child cross and peevish, but that they date their existence almost from the very beginning of fœtal life; that as early as the sixth or seventh week after conception the germs of the teeth are forming in the dental groove — soft and pulpy, it is true, until about the fourth month, when calcification begins, the whole tooth being thoroughly solidified and the enamel formed before it makes its appearance in the baby's mouth, except that the root continues to elongate.

As the teeth can only be formed from tooth-material, and as this is required from the very earliest beginning of the germ formation, teach the mother that she alone can and must supply this material. If she does not furnish it, designedly or otherwise, in sufficient quantity over and above the amount requisite for her own use, it will be subtracted from her own osseous tissues, and she will suffer correspondingly, not alone in her teeth and bones, but under very insufficient regime even "the brain will become enfeebled from lack of phosphoric acid, and the muscles pale and flabby," and the mother absolutely famish for lack of the necessary elements of nutrition, even while apparently enjoying the most luxurious diet.

Teach the mother what this tooth-making material is, and where she is to find the necessary elements. Teach her that she must not only have *proper* food, and *sufficient* food, but that her system must be kept in condition to digest and assimilate this food. Teach her the importance of physical exercise, of fresh air and sunlight, and of cleanliness, as indispensable adjuncts to diet.

Teach her that these principles must be applied and these precepts acted upon, not only through the nine months of *gestation*, while she supplies all the elements of nutrition through her blood, but also during the whole period of *lactation*, when her milk is not only the sole magazine of lime-salts for the further development of the teeth and bones, but the only source of nutriment for the whole body of the rapidly-growing child.

If, after weaning, she will habituate her child to plain, wholesome food, with scrupulous cleanliness of, and abundant exercise for, the organs of mastication; provide it with comfortable, easy dress, and enforce strict obedience to the laws of health, what a splendid race of men and women should we see in the next generation!

In the words of Dr. Welchens, "Good, substantial food, containing all the elements necessary to build up and nourish the various tissues of the body — clean, warm clothing to protect the surface, and regular out-door exercise, all with temperance and moderation, will not only raise the child well,

but, in a large majority of cases, *raise a denture* well calculated to withstand the changes of life, and endure the wear and tear of mastication." Mothers and children would thus attain a higher standard of physical development, for these benefits could not accrue solely to *the teeth*. "A knowledge and observance of nature's laws must result in an improvement of the whole being, body, mind and heart."

Extract from "EDUCATION OF MOTHERS," *by* "*Mrs. M. W. J.*," *in* SOUTHERN DENTAL JOURNAL, *October, 1883.*

ADVICE TO MOTHERS

ON THE

CARE OF THE TEETH.

LETTER I.

HOW THE BODY IS BUILT UP — IMPORTANCE OF THE TEETH IN THE HUMAN ECONOMY.

My Dear Young Friend:

A year ago you left us, a happy bride; you then felt that nothing could be added to the completeness of the tie binding husband and wife; now, however, you write me that a still greater fulness is to round the measure of your life; you ask me to tell you how to live, so that the *new life*, now being built up from your own heart's blood, may be physically pure and perfect.

Especially in regard to the formation, growth and care of THE TEETH do you desire advice and information.

Much is involved in these momentous questions; they have formed the subject of earnest investigation and profound thought; the laboratory of the chemist and the microscope of the histologist have aided in solving the mysteries of life.

You know that your body is built up, little by little, from the materials gathered from your food, aided by exercise, fresh air and sunlight.

From your food are gathered the elements that knit the bones which form the framework; the flesh which clothes the bones; the blood that courses through the veins; the nerves, and the brain which controls the whole.

If the food does not contain the various elements necessary to build up the several portions of the body, so different one from the other — the bones solid and unyielding; the flesh so delicate and tender; the blood so brilliant in its coloring, rushing through the veins and arteries, distributing the life-giving elements to every portion of the system, each little drop coming back to the heart every half-minute, bringing its portion of that which has been rejected as worthless — disease and death will ensue.

In the meat and the bread, the fruits, vegetables and other articles which make up our daily food, must be found all the constituents of bone and muscle, flesh, blood, and brains.

This food must not only be taken into the system, but it must be thoroughly prepared by mastication for digestion in the stomach, while the system must be in such a condition of health as to *assimilate*, or appropriate and make use of the food, as it passes into the circulation.

Without GOOD TEETH there cannot be thorough *mastication*.

Without thorough mastication there cannot be perfect *digestion*.

Without perfect digestion there cannot be proper *assimilation*.

Without proper assimilation there cannot be *nutrition*.

Without nutrition there cannot be *health*.

Without health, what is life?

Hence the paramount importance of the teeth.

LETTER II.

WHEN AND HOW THE TEETH ARE FORMED.

Because the teeth are of such importance in the building up of the body, the creative energies are directed toward their formation at a very early period.

The dimpled hands and rosy feet of the baby, which so delight the eyes and heart of the young mother, are perfect in form and shape at its birth; the first pearly tooth does not make its appearance until many months later, and six years must elapse before the permanent teeth begin to come into place.

Six months before the birth of the child the germs of the twenty baby teeth are lying, side by side, in the dental groove, while the germs of the permanent teeth are all lying hidden in the tender gums when the baby is born; and yet how many months

and even years must elapse before the last are called into active service.

And all this time they are growing. Taking their shapes long before the little limbs bear any resemblance to the plump legs and arms that are so beautiful to the mother's eye, the teeth are being built up, atom by atom, as the necessary elements of tooth-food are furnished by *the mother's blood.*

For seven months before, and seven months after birth, the first little baby-tooth is growing — at first a mere sac containing the pulp, yet bearing the shape of the future tooth. In this sac, and around the pulp, are deposited the calcareous elements, or lime-salts, gathered from the mother's food, of which the tooth is formed.

Little by little, the tender, living pulp is surrounded by dentine, the bony substance forming the body of the tooth. Over this is laid the glassy outward envelope of enamel, dense and impervious to the healthy fluids of the mouth; and thus, perfect in substance, size and shape, the crown emerges from the gum, the root growing longer as the walls of the socket build up around it to hold it firmly in its place. A minute opening at the apex of the root called the foramen, gives passage to a nerve, a vein and an artery, through which the circulation is carried on that conveys the nutrient element to every portion of the substance; for the teeth, dense as they appear, are endowed with the most sensitive nerves, and are subject to the same

laws that govern every other portion of the human organism, a change of particles — "composition and decomposition" — going on, slow but constant, as long as life lasts.

If the great Creator deems the little baby-tooth of sufficient importance to require fourteen months for its growth and development, while nine months suffice for the *eye* or the *ear*, should not the mother look upon it as a precious jewel, worthy her most watchful care lest it suffer injury by her neglect and carelessness?

Should she not earnestly seek to learn what are those elements of tooth-food which she alone can and must supply, and where they are to be found in the greatest purity and abundance?

She does this much for her flowers and her bird; can she do less for her baby's teeth, on which depend so largely its future health and happiness?

LETTER III.

WHAT THE TEETH ARE, AND OF WHAT THEY ARE FORMED.

That you may the more readily comprehend the necessities of the teeth, and how you may provide those of your babe with the proper elements to make them so sound and perfect in structure that they will last as long as life itself, with proper care and treatment, we will now consider "What the tooth is," and of "What elements it is composed."

We have seen that the tooth is an organized body, each one having its own nervous and circulating system.

The central cavity of the tooth is occupied by *the pulp*, which is simply an enlargement of the nerve, vein and artery, mentioned as passing through the apex of the root, and thus connecting with the general nervous and arterial systems.

From the pulp ramifies a circulatory system, which carries the nutrient elements to every portion of the tooth substance, building it up sound and strong if the requisite elements are brought to it; leaving it soft and cartilaginous if the supply is insufficient; even taking away from the mother's teeth the materials for those of her babe, if she does not supply a sufficiency for both.

The pulp is surrounded by the bony substance of the body of the tooth, called *dentine*, which, being liable to decay by contact with various external agencies, is protected by a thin layer of the most dense material found in the human system, called enamel; its appearance is familiar to all, being of a fine glassy texture and smoothness.

The root, being entirely hidden in the gums and bony socket, and thus protected from injurious contact with foreign elements, is covered with a less dense material than either the enamel or the dentine, called *cementum;* this material bears a closer resemblance to *bone* than any other portion of the tooth.

Now, what is *bone?*

If you have ever lived in the country, and know anything about *raising chickens*, you know that when eggs are laid with the shells too thin, as often happens — sometimes but little more than a mere skin confining the contents — *bones*, left from the meat used at table, are heated and pulverized, and fed to the hens, to furnish them with *lime* for their egg-shells. When bones are so thoroughly burned as to destroy the animal tissues and leave only the mineral elements, bone-black is the result, of which eighty-eight parts in every hundred are the phosphate and carbonate of lime, the remainder being mainly carbon. The teeth, as they stand in the mouth, differ from bone mainly in the much larger proportion of these elements, about eighty parts in every hundred of the constituents of tooth-substance being the phosphate and carbonate of lime, phosphate of magnesia, etc. If teeth are burned, the mineral elements remain; if they are dissolved in strong acid, the lime-salts disappear, and a cartilaginous or jelly-like mass remains, being the *animal basis* with which the lime-salts are combined in the cells of which the tooth is built up.

Thus the constituent elements of tooth-substance are both animal and mineral, by far the greater portion of the latter being *lime* in its various combinations.

You must therefore furnish your blood, through your food, with a sufficient supply of *lime* to not

only nourish your own bones and teeth, but also to build up those of the little being for whose physical proportions you are henceforth responsible.

Upon you, and you alone, is laid this responsibility. The physical impress of the *father* was stamped, once for all, upon this new being at the moment of conception. If for *good*, you will only make it better; if for *evil*, you alone can apply the remedy.

From your system alone can the nutrient elements be drawn.

If the supply be deficient, upon you alone will fall the consequences, and they are often very serious.

If the supply be very meagre, your own bones and teeth will be drawn upon to supply the deficiency; your teeth will become sensitive and painful, and decay will set in; your muscles will become pale and flabby, and you will feel weak and languid; even the very brain itself, in extreme cases, will become enfeebled from lack of the phosphoric acid withdrawn to form the phosphates of lime and magnesia entering into the composition of the teeth and bones.

In the words of Dr. G. R. Thomas: "The child, while dependent upon the mother, gets lime, phosphorus, silex, potash, and all the other elements of which the teeth are composed, in just such proportions as she gets them from the food nature provides, in their natural proportions. But where

can the child, in its forming state, get these necessary elements, whose mother lives principally on starch, butter and sugar, neither of which contains *a particle* of lime, potash, phosphorus or silex? . . . Nothing short of a miracle can give her a child with good teeth, and especially with teeth well-enameled."

I hope that I have now succeeded in impressing upon your mind a sense of the solemn responsibility you have assumed, in taking upon yourself the duties of maternity, and that you are now ready to ask me, "Where shall I find these elements?" and that you feel willing to make some little self-sacrifice, if necessary, in the matter of *diet*, in order to benefit not alone your unborn babe; the results, if you are faithful to your trust, will be traced through future generations, and your posterity will call you blessed.

LETTER IV.

FOOD PRINCIPLES.

To furnish the system with the necessary lime-salts, you must not for the moment imagine that I would advise you to attempt the use of *lime* itself, in the crude form in which it is known to you, though much benefit is derived from the free use of *lime-water*, prepared from this crude lime; very cheaply and easily prepared *at home*, though quite expensive when obtained from the druggist.

To make it yourself, you require simply a teacupful of clean lime, such as is used by house-builders.

Put this in a quart pitcher and fill it with cold water, stirring thoroughly until it looks like milk; tie a piece of thin muslin over the pitcher and let it stand twenty-four hours, or until perfectly clear; pour it off carefully, straining through the muslin, being careful not to disturb the lime, and stop as soon as it is the least *cloudy*. Keep this clear lime-water in a bottle for constant use, refilling the pitcher on the same lime, and stirring well. This can be repeated several times, or until the lime loses its strength, when the pitcher must be emptied and washed, and the process renewed.

A tablespoonful of this lime-water, in a glass of water or milk, is imperceptible to the taste, and even two or three are not unpleasant. It leaves a peculiarly sweet and pleasant taste in the mouth, though if too strong (which should be avoided), it is harsh and acrid.

This alone, taken three times a day, has been found beneficial to prospective mothers, in hardening teeth rendered soft and sensitive from deficient mineral lime-salts; also in hardening children's teeth, and in hastening their development when late in coming into place.

It should also be used to rinse the mouth and *bathe the teeth* after the use of acid fruits, or lemonade, or strong medicines. Of the effect of acids

upon the teeth, more will be said in another chapter.

We will now investigate the subject of Food Principles, and endeavor to learn where the essential elements are to be found, in such shape as to be readily digested and assimilated by the human system, passing from the stomach to be taken up by the little blood-vessels and conveyed to every portion of the body, "teeth and toe-nails" included.

We must know "what to eat, when to eat, and how to eat."

The human body is composed of thirteen essential chemical elements, variously combined. These same elements are necessarily the elements of the food from which the body is built up.

The most simple classification of nutritive principles places them all under four heads: the *aqueous*, the *saccharine*, the *oleaginous*, and the *albuminous*.

By the combination of these principles our foods are formed. Milk, the one article of food furnished by nature for the young human being, contains the types of all four groups — the *aqueous* as water, the *saccharine* as sugar, the *oleaginous* as butter, and the *albuminous* as casein or curd.

Milk is therefore a perfect article of food, containing all the essential principles of infantile nutrition.

In the brute creation, through obedience to nat-

ure's laws, the milk is what it should be, and the offspring, as a rule, healthy, with sound and perfect teeth.

That the human mother's milk may be what it should be, and her offspring also be healthy and have sound teeth, her milk must contain the chemical elements which are essential to these four nutritive principles. Her milk is evolved from her blood; her blood is evolved from her food; therefore her food must contain these elements.

Dr. A. C. Castle said twenty years ago, that "chemical analysis demonstrates the natural milk almost identical with the blood, abounding with the phosphates. Indeed, with correctness it might be asserted that the difference between milk and blood is in color — the one is white, and the other red."

It is not necessary that I should place before you a list of *all* the articles of diet from which we may obtain the elements of nutrition.

No one article of diet can supply one single element of nutrition, for so generously has nature supplied them, and so variously has she combined them, that we can hardly go astray if we use her gifts aright.

But alas! in the refinement of our *higher civilization* we deprive ourselves of her most precious gifts, rejecting scornfully the very elements most essential to our physical well-being.

The beasts of the field accept her gifts with re-

joicing, and thrive thereon. The poor savage, in his native wilds, has coarse fare and few comforts, but he is erect and strong, and his teeth are sound and regular.

A well-known writer and dentist says: "I am often asked, when discoursing upon this subject to my patients, 'What articles of food ought we to eat, in order to make good teeth?' I answer, everything that grows will make good teeth, if eaten in its natural state, no elements being taken out, for every one of them does make good teeth for horses, cows, sheep, and all other animals that live on nature's productions, pure and unadulterated."

That you and your children may be strong and your teeth sound, I do not ask you to eat grass, nor do I ask you to go back to a state of savagery, but I do ask you to take your food in the proportions in which nature provides it.

And this brings us back again to your question: "Where shall I find these elements?" In my next letter I will endeavor to help you to answer this question.

LETTER V.

WHERE THE ELEMENTS OF TOOTH SUBSTANCE ARE FOUND — CALCIUM.

The constituents of tooth substance being what we are chiefly looking for, we will first take the chemical element, *calcium*, or *lime*, which we

have seen to be the principal element in tooth substance.

Calcium is generously furnished by nature. It is found in milk, in eggs, in potatoes, and many other vegetables and fruits; but especially does it abound in the grains or cereals which furnish a large proportion of our food; and most abundantly is it found in *wheat*, which furnishes "the staff of life"; but alas! *not* in the fine white flour of which are made the snowy loaves of bread which the good housewife displays with such pride.

Dr. N. J. Bellows, of Boston, speaking of food, says: "It is well known that our pale-faced girls and our feeble-minded children are brought into that condition mainly by living on sugar, butter, and superfine flour, out of which have been taken the very elements that make bone and blood, and give energy to the brain and nervous system; and the common sense remedy for all these terrible evils is to be found in a simple resort to nature's own storehouse."

In 500 pounds of *whole grain* (wheat) there is:

Muscle material	78 pounds.
Bone and teeth materials . .	85 "
Fat principle	12 "

500 pounds of *fine flour* contain:

Muscle material	65 pounds.
Bone and teeth materials . .	30 "
Fat principle	10 "

Thus, in flour, *as generally used*, to quote the words of Dr. John Allen, of New York city, a den-

tist of fifty years' experience, who has given this subject much attention:

"We change the proportions of the mineral element (which is deposited in the outer portion of the grain) by bolting out nearly two-thirds of it from every barrel of flour, and discarding it from the staff of life, simply because it is the fashion to have our bread made of the finest flour that it may be white instead of dark.

"It is estimated that a healthy child consumes half a barrel of flour in a year, and if this be fine white flour the child is denied twenty pounds a year of that portion of the grain which contains the proper materials for bones and teeth. This deficiency of the mineral element in the food causes the teeth to be comparatively soft and chalky in their structure, and the result is, in this country, where fine flour is principally used for bread, there is not one in twenty without more or less decayed teeth before they have passed the morning of life."

Flour from the whole grain of wheat, as prepared to-day, is very different from the old-fashioned "Graham flour," though still retaining the name.

It contains all the mineral elements, but the outer portions of the grain (in which these elements are found, and which is separated and rejected by the "bolting" or sifting process which gives the fine white flour in general use) are so finely ground, and so thoroughly incorporated with the whiter

portions or heart of the berry (which contains no gluten, but only starch) as to change only the *color* of the flour, while making it sweet and pleasant to the taste, and without any of the unpleasant coarseness of the olden methods which incorporated the *bran* in coarse flakes, repugnant to all delicate palates and indigestible to many stomachs.

The color of the bread made from the "Graham flour" of to-day is no more objectionable than that imparted to the finest white flour by the sugar, eggs, spices and other ingredients used in making *cakes*, which are never rejected because of their *color*, whatever may be said of their digestibility, or rather their *indigestibility*.

Use "Graham flour," then, for your bread, your biscuits, and such plain cakes and gingerbread as alone are admissible for children, or for yourself either, if you would have perfect health.

Above all, "*Graham gems*" for breakfast, instead of hot white biscuit, battercakes, etc. These can only be properly baked in the cast-iron gem-pans, which come in sets of from eight to twelve shallow cups, joined together in one pan. This should be placed in the oven to heat, previous to mixing the batter.

For the batter use only fresh "Graham flour" and cold water, with a little salt; no lard or butter, but plenty of "elbow-grease," and no yeast-powder or soda. Mix the batter rather thin, and stir rapidly and thoroughly till it is in a foam; then drop

it quickly into the hot pans, and place immediately in a quick oven, and you will have a light, sweet, toothsome puff, which can be eaten with impunity by the direst dyspeptic.

If your grocer cannot supply you with such flour as I have described, order "The Best Amber Graham Flour" from the "Cascade Mills" of "F. Schumacher," Akron, Ohio.

It is preferable not to have a large quantity at once, as in warm weather it readily generates small white worms and little black weavils. Get your neighbor to join you in ordering a barrel, and then you will benefit them as well as yourself.

If fine white flour must be used, the nutritive elements, lost in the bran, can be in a degree restored by the use of Prof. Horsford's "Self-raising Bread Preparation" in place of the ordinary yeast and "baking powders" or the old-fashioned "Soda and Cream Tartar."

The former is put up in two small packages; one of chemically pure bi-carbonate of soda, the other a combination of phosphoric acid with lime and magnesia — the essential constituents of tooth-substance. Each package of one dozen contains the proper measure and instructions for use. It loses its value and "leavening" properties with age, and should therefore be purchased only from reliable first-class grocers. The two packages are combined in "Horsford's Phosphatic Baking-powder," but this deteriorates very rapidly, and

should only be used when known to be fresh from the manufacturers, at the Rumford Chemical Works, Rhode Island.

Oatmeal is also an invaluable article of diet, as a source of bone and tooth food.

"Hecker's partly-cooked oatmeal" is to be found in every first-class grocery.

A "double-boiler" is almost indispensable for properly cooking not only oatmeal, but also *grits* or *hominy*, which are also good tooth-food, though not equal to whole wheat or oatmeal.

A porcelain receptacle, suspended in the tin boiler containing the boiling water, renders *burning* impossible even to the most careless cook, prevents all waste, and does away with the necessity of *stirring*; once placed over the fire, it can cook undisturbed until wanted; indeed, "the longer, the better."

Now, if your diet consists largely of milk and eggs, potatoes and good meat, with abundance of ripe fruits, supplemented by "Graham bread in its different forms, and a good bowl of "oatmeal and milk" for your breakfast, every day, you will not fare *very hard*, while your system will be well supplied with lime-salts for both yourself and your babe.

If the "Graham" bread should prove really unpalatable at first, you can begin by mixing with your white flour one-third or even one-fourth the quantity of "Graham," and thus accustom yourself

to it gradually. Even so small a proportion will carry with it some benefit, and you will soon learn to like it as well, if not to prefer it to all white flour. Mere *taste*, however, is a matter of small consideration, compared with the great interests at stake.

There are some highly-favored portions of our country where these precautions are rendered unnecessary by kind nature. In Middle Tennessee, West Virginia, and the "blue-grass region" of Kentucky, the soil, and consequently the vegetation and well-water, is so strongly impregnated with lime-salts as to give a large supply of this element to all articles of food, both animal and vegetable, and consequently a corresponding superiority of tooth and bone-structure to both the people and the live-stock.

It is well known that the finest horses and cattle in the world graze upon the rich pastures of the limestone soil of Kentucky, and that her tall, strong men, with their fine teeth, are recognized wherever they go.

LETTER VI.

OTHER CHEMICAL ELEMENTS.

We have hitherto looked only to *diet* for a supply of lime-salts.

If you are *boarding*, or, from any other circumstances, cannot control your diet, or if, from long-established habits or constitutional disease, your

system fails to assimilate the lime-salts as presented in this form, and your teeth grow sensitive, ache and decay, from the drain upon them in your present condition, you may be obliged to resort to the *doctor* and the *drug-store* for the same thing in less palatable form.

There are various preparations of the inorganic lime-salts, designed to effect the same results and supplement the above *regime*, and which have been found very beneficial when the stomach is too weak or the appetite too poor to render *foods* available.

Dr. Abbot, of New York, says he finds, where children have a repugnance to Graham bread, oatmeal, etc. (which will, however, seldom be the case if the Graham flour before mentioned is properly prepared, and if good oatmeal be given with plenty of milk), that the "Syrup of Lacto-Phosphate of Lime" is to be recommended. He says: "I have given this to families of several children, sometimes at intervals, for years. It is the simplest form for easy assimilation, and the children will take it just as readily as they will lemonade. I have had mothers under my care, from seven months before the birth of their children, and administered the lacto-phosphate for weeks at a time, for two or three months. I have had hundreds of cases, in which the remedy has been used with fair results.

Another eminent medical writer says:

"During pregnancy many women suffer from caries of the teeth and dental neuralgia. The calcareous salts required for the development of the fœtal skeleton must be supplied by means of an increased ingestion of these materials on the part of the mother. In default of this augmented consumption, the nutrition of the maternal bony tissues is affected, and dental caries results. Many pregnant women have a morbid appetite for calcareous and other mineral substances. Preparations of calcium, especially the phosphates and hypo-phosphates, should, in view of the facts mentioned, be administered to *enceinte* females suffering from the above dental troubles."

Dr. Prothro finds "Winchester's Hypo-phosphites of Lime and Soda" very beneficial, while Dr. J. R. Walker, of New Orleans, after having experimented largely with these chemical preparations, finds that he obtains equally satisfactory results from the free use of lime-water alone.

Of course, however, you will consult both your dentist and your physician before resorting to the above medicinal preparations.

In this consideration of the elements of tooth-substance, we have devoted our attention exclusively to *calcium*, not only because it constitutes by far the largest portion of tooth-substance, the remaining elements bearing only a very small proportion to the whole, but also because they are found in meat, milk, eggs, and other such com-

mon articles of diet, so that you are scarcely liable to fail in receiving an adequate supply.

Hydrogen and *oxygen* as combined in water, furnish three-fourths of the weight of the human body.

Nitrogen is another essential element; the various organs of the body and the blood containing at least seventeen per cent.

Starch, sugar, gum and butter contain no nitrogen, and therefore cannot, either alone or combined, long sustain life. Arrow-root, corn-starch, and other similar starch preparations so often used for infant's food, make only *fat*, and can only really nourish the child when they are prepared with milk. It is on record that an English mother, some years ago, was sentenced to death for *the murder of her child*, because, in spite of the warnings of her physician, she persisted in giving it only that starchy form of food, and the child died of inanition. I myself nearly lost one of my own children through ignorance on this point.

The babe was reduced to such a point of inanition that it was given up as hopeless by physicians, and was only cured by the persistent use of *bran baths* and *bran poultices*, from which nourishment was absorbed by the pores of the skin.

Let your diet, therefore, be selected with reference to these principles.

The body being made up of many elements differing in chemical properties, textures which are so chemically different require different aliments

for their nourishment, a considerable variety of food being absolutely necessary for the preservation of health and life.

As the same nutritive element is usually found in different articles of food, often both animal and vegetable (with the exception of tooth elements), select that which your own experience has proved to be best adapted to yourself in regard to digestibility; where neither has any decided advantage in this regard, then consult your taste and your convenience.

Let your food be thoroughly masticated, and well mixed with saliva, before it goes to the stomach, that it may be the more readily permeated by and acted upon by the gastric juice.

As the *saliva* is secreted by the glands of the mouth, to be mixed with the food in its preparation, by mastication, for the stomach, so the *gastric juice* is secreted by the glands of the stomach, and mixed with the food, in digestion, to prepare it for passing into the circulation, to build up and nourish the body. If the food is not properly prepared in the mouth, by mastication and insalivation, the gastric juice cannot so readily permeate and mix with it, and digestion is rendered more difficult.

Aid your digestive powers by exercise and fresh air.

Regulate your meals so that all that is eaten at one time may be digested and passed into the system before a fresh supply is sent to the stomach.

The action of the gastric juice or digestive fluid of the stomach reduces the food to a succession of *conditions* or *states*.

If fresh food is sent to the stomach, after its work has been going on a little while, the work has to re-commence for the new food, and that which was already partly digested is almost certain to *sour* and spoil the whole mass. This is one of the most fruitful sources of indigestion and dyspepsia.

To use a homely illustration, it is much as though you were to put a cake in the oven to bake, and when half done take it out to stir in some forgotten ingredient!

Bear in mind also these general principles:

"Solid food is sooner digested than liquid.

"Vegetable food requires for its digestion more time than animal food.

"Animal diet yields a larger amount of nourishment than vegetable.

"Bulk should be in proportion to the nutrient principle.

"Too much rich food overloads and oppresses the system, and clogs the organs in the performance of their several functions, while the circulating fluid becomes too thick and stimulating, and disease inevitably follows." *

* For the *facts* contained in these two chapters on "Food Principles and Chemical Elements," I am indebted to that most valuable treatise, "*Food and Diet*,"

LETTER VII.

EFFECTS OF DISEASE UPON TOOTH-STRUCTURE.

Having learned how to provide your blood with the chemical elements essential to the various tissues of the body, and especially those necessary for the formation, nutrition, and growth of the teeth, we reach another important point in the care of those organs *before their eruption:* and that is, the effect of various diseases upon tooth-structure.

The rapid heart-beat, and the quick throbbing of the pulse of the infant, are a certain index to the rapid changes taking place in the growing tissues; any interruption in this growth must leave its impress upon those tissues. Especially is this true of the teeth, which, like the hair and nails, being *dermal appendages* (or of the nature of *skin*), are peculiarly liable to be injuriously affected by skin diseases, accompanied with much fever. You know how dry and lustreless the hair becomes during sickness, and how often it dies and falls from the scalp, after protracted fevers. You have also, perhaps, noticed that there are grooves and furrows and white spots on the nails during and

by Jonathan Pereira, M.D., F.R.S., etc., a physician of great experience, a most learned and scientific man, and a highly successful writer. His work summarizes the investigations of Liebig, Berzelius, Bischoff, and other eminent chemists, and constitutes a reliable *vade mecum* for amateur investigators.

after severe illness. The hair and nails are growing rapidly all the time, and therefore these effects are promptly visible, while the teeth, after eruption, being extremely dense and hard, changes in their texture are slow and less visible to the eye as they effect the internal and less dense portions, rendering them extremely sensitive and liable to decay.

But before the birth of the child, while the teeth are growing, such forms of disease as scarlet fever, small-pox and measles, in the mother, or suffered by the child itself after birth, but previous to the eruption of the teeth, leave their impress upon those organs as unfailingly as upon the hair and nails in after life.

Another consideration is, that while disease lasts there will be little or no appetite, little food will be taken, and even that small quantity will not be properly digested; no new material being furnished the growing teeth, their development will be checked, and, as the final result, the forming enamel will be marred by grooves, furrows, or white spots, showing after the eruption of the teeth the unfailing and indelible marks of "interrupted nutrition." Guard yourself, therefore, carefully from all exposure to this class of diseases, before your child is born — if you are not exempt from them by a previous attack, and even then a "second attack" is by no means impossible — and shield your child even more carefully, until after the teeth are all erupted.

The pitted and "honeycombed" appearance of the teeth, resulting from these causes, is not only unsightly in itself, but is a sure precursor of early and rapid decay.

There is another point that is worthy of serious consideration, and that is the possible effects of *vaccination* upon the teeth. One hundred years ago, when this practice was first introduced, as the greatest possible boon to afflicted humanity, little was known regarding the development of the teeth. The question under consideration was, of course, not then raised; in fact, it is only of late years that it has become a matter of investigation. But from what is known of the effects of vaccination upon the general system, and from the similarity of these effects, in a circumscribed degree, to those of small-pox, measles and scarlet fever, in the accompanying "blood poisoning" — the injurious effects of the latter class of diseases upon the teeth being so positively known, it would seem to be only a proper measure of precaution to postpone vaccination until the teeth are beyond any possible danger.

The liability to small-pox, for a child, surrounded by proper sanitary conditions, and under a mother's watchful care, is a contingency so remote and doubtful, while the danger from vaccination (if any) is direct, immediate and *avoidable*, that it is, as I said, only a wise measure of precaution to postpone vaccination until the teeth have passed the danger-point; and this is — when?

Certainly not until after the enamel of the last permanent tooth is completed, and the wisdom-teeth erupted; for the pitting and honeycombing of even the wisdom-teeth, though not offending the eye, as in the case of the front teeth, nevertheless renders them liable to rapid decay.

And even then, can we say that it is consistent with prudence, or that *we have the right* voluntarily to expose the teeth (and the whole system as well) to the disastrous effects of interrupted nutrition? For, as long as life lasts, in the teeth, as in all other portions of the body, nutrition is carried on through the circulation — worn-out particles being removed and new supplied — and while *disease* lasts, there is little or no nutrition supplied to any portion of the body; and in no portion of the system are the results of disease more disastrous than in the teeth.

There are also other diseases, as diabetes, consumption, scrofula, and certain other inherited taints of blood, which make their unfailing mark upon the teeth; unmistakable to the well-informed dentist, but outside of our field of inquiry.

Rev. Dr. Kirkus, of Baltimore, in a recent essay on *Woman*, says: "By far the most important incident of marriage is *motherhood*, and no doubt many girls are allowed to grow to maturity, and even to become engaged to be married, without any proper warning or instruction as to what motherhood involves. The incredible ignorance of some

young wives on such subjects amounts almost to idiocy."

If more, however, was known and understood by *young people*, and taken into consideration *before marriage*, much entailed suffering and misery might be avoided, for it is in this sense that "the sins of the fathers are visited upon the children unto the third and fourth generation."

LETTER VIII.

DENTITION AND DISEASE.

We will now pass over the intervening time until, when, having given birth to your baby, and having nursed it faithfully at the breast, you are feeling more or less the effects of this drain upon your system, and are looking forward to the time when the little pearly teeth making their appearance will show that nature is preparing the way for other food.

No exact rule can be laid down as to the time of their appearance, as it varies with the general growth of the child.

There are on record cases where children have been born with teeth in the mouth — Louis XIV., of France, having had two; others who have lived to old age without ever having any teeth at all; others, again, who have never exchanged the little

baby-teeth for the larger permanent ones; and still others who have cut their first baby-teeth at ages varying from twelve to twenty-six years! These, however, are abnormal irregularities with which I hope your children will never be troubled.

As a general rule, the baby begins to "cut its teeth" (and the first two appear in the centre of the lower jaw) at about six months old — four months being unusually early, and nine months very late. If *dentition* is perfectly regular, the teeth will appear in pairs, alternately, below first and then the corresponding teeth above, in the following order:

Two in the centre of the lower jaw, and two above, called *central incisors*; followed by one adjoining on either side, called *lateral incisors.*

These eight "cutting teeth" will appear notched, like the edge of a saw, when they first come through, this form facilitating their eruption, but this will soon wear down; they will usually all take their places within a short time.

Then there will be a period of rest; after which the work will recommence far back in the little jaw, and a jaw-tooth — double-tooth, "grinder,"— or, as properly called, *molar* tooth, will appear, one on each side, first below and then above.

There will now, of course, be twelve teeth, and the baby be probably from twelve to fifteen months old.

After a rest from the serious effort of pushing

forward these four large square teeth, the vacant spaces are next filled in with the pointed "dog-teeth," *canines*, or as popularly known, "stomach-teeth" below and "eye-teeth" above.

By the end of the second, or early in the third year, the full set of twenty baby-teeth, "milk-teeth," or *deciduous* teeth should be completed by the appearance back of each of the first jaw-teeth, of another grinder or *molar*.

The eight *incisors* and the first four *molars* generally make their appearance without any serious difficulty if both mother and child have been kept in a state of good general health, by means of proper diet, suitable and sufficient exercise, bathing, and plenty of fresh air.

A child ought not to suffer any more when cutting its teeth than do the young of domestic animals; the process is the same in both cases.

Many diseases undoubtedly may, and often do occur, during the process of *dentition*, but it does not by any means follow that *teething* is the *cause* any more than it is the *result* of these diseases. It is, nevertheless, a sad fact that children frequently suffer seriously when they are cutting their *stomach* or *eye teeth*, and that the time for the appearance of these teeth is looked forward to with grave apprehensions.

Now why is this? These teeth, having but one point to cut through the gum, it would seem as though the process should be an easy one, com-

pared with the eruption of the large grinders, and the child being older and stronger should be better prepared for it.

Now there are usually two causes in operation about this time which, singly or together, to the eye of a mother appear to have much to do with causing the sickness and even death of so many children at this period of their dentition.

One is, that the four sharp little teeth above and below can *bite so hard* and cause the mother so much pain, and the four grinders are apparently so well able to do good work upon food (being undoubtedly designed for this work ultimately), that they are put to work *too soon*, and the change from the mother's milk made without sufficient gradual preparation of the delicate stomach.

The baby *wants to bite*, and instead of being given some smooth, hard substance, it is given *crackers* and *sweet-cakes* to bite upon. This starchy food sours upon the stomach, and gives colics, indigestion and diarrhœa; or — even when it is apparently well-digested — containing no mineral elements of nutrition, fails to enter the blood, the babies, even when fat and apparently well-nourished for a time, rapidly losing flesh and sinking under trivial disorders — victims to mineral inanition, *not to teething*.

Another efficient cause is, that as the baby is now creeping about on the floor, or even trying to stand alone by a chair, the long clothing, which

has hitherto protected its limbs so thoroughly, is now discarded; and while the upper portions of the body are still well protected, the lower limbs are almost bare, except little short socks and tiny slippers on the chubby feet, with nothing whatever but short, flowing skirts between the top of the socks — which are half the time kicked off, too — and *a garment* which is but too often wet and cold.

The lower extremities being chilled, the chill strikes to the bowels, and diarrhœa ensues. Especially is this the case in summer. Let the clothing be as light as you choose, in hot weather, but let it be *of uniform thickness*, and there will be less "summer complaint" and fewer deaths *from teething*.

We will now consider the more legitimate troubles connected with teething:

The teeth in their development necessarily crowd and press against the tender gums from within; this naturally causes more or less swelling, redness and inflammation, especially in the case of the upper teeth. This irritation causes an increased flow of saliva, which is rendered more acid than in its normal state, by the abstraction of its alkaline elements to supply the increased demand of the system in developing the teeth. This should be corrected by proper diet and the free use of *lime-water*, which is prescribed by Dr. Wm. S. Stewart in his highly successful treatment of cholera infantum.

This acid saliva, in such large quantities, if not counteracted by this simple alkaline treatment, becomes one of the chief causes of the "diarrhœa of teething," so often fatal if not held in check.

A certain degree of looseness of the bowels should be no source of apprehension, as it is advantageous rather than otherwise, in reducing inflammation, when kept within bounds by judicious diet, both on the part of the mother and of the child itself, when the mother's milk is supplemented by other food. *Constipation* is much more to be dreaded, and must be promptly counteracted.

The inflammation of the gums — if dentition be somewhat irregular, and a number of teeth are crowding up at once — may be very severe, and produce fever. Too much blood may also be determined to the head, and this, at a period of life when the brain is very large in proportion, is sometimes a cause of *convulsions*, when preventive means are not employed. Lancing the gums, at the proper moment, is the certain, safe and simple remedy, in the hands of an experienced dentist, who knows just when, where, and how to do it.

Another source of intense suffering to many a tender babe is *earache*, a sympathetic result of this inflammation, branches from the same nerve supplying both the teeth and the ear.

The earache, even of a very young babe, is readily recognized by the way in which it rests its head cautiously against the nurse's breast; its aver-

sion to motion, the slightest movement seeming to increase its suffering, and its pathetic way of carrying the little hand to the ear, involuntarily pointing out the seat of pain. This form of earache is relieved by the same simple remedy — lancing the swollen, inflamed gums, just at the right time, by a competent dentist or physician.

LETTER IX.

CARE OF THE TEETH, TEMPORARY AND PERMANENT, IN SICKNESS AND IN HEALTH.

As you have cared for your baby's teeth, from the very inception of the germs in the dental groove, throughout the period of their formation and growth, so you must continue to care for them after their eruption.

You must see that they are supplied with nutrient elements to complete the growth of the root, and to keep them in good condition, for — as has been said before — in the teeth, as in every other portion of the human frame, worn-out particles are removed, and new supplies required, as long as life lasts.

The baby's teeth, when they first emerge from the coral gums, are like little pearls, white and shining, clean and sound; but they will not long remain so, if watchful care be not bestowed upon them.

From the moment the first teeth appear, give them your personal, especial care. Wash the little mouth carefully, and see that no particles of milk or other food remain lodged in the soft tissues of the lips and cheeks, under the tongue, or around the little teeth, to sour and produce disease.

Wrap a piece of soft linen around your finger and rub the teeth carefully and gently; for when they first emerge they have but little root, and are held in place only by the elastic tissues of the gums and the pressure of the tongue and lips; as the roots grow longer, the sockets are built up around them, to retain them firmly in place.

And right here, let me give you a word of caution against allowing the formation of the habit of "sucking the thumb" or fingers, no matter how much it may appear to help in "keeping the baby quiet," for there are at least two ways in which this habit is injurious. The teeth not being as yet firmly held in place, the constant pressure of the fingers is liable to push them into irregular positions, interfering with distinct speech as well as with good looks; and again *wind* is swallowed, in the fruitless sucking, and the stomach is unduly distended, causing colics and other disturbances. Especially is this practice liable to affect the regularity of the permanent teeth, if the habit is allowed to become fixed; and even *the nose* is sometimes permanently disfigured by the *hooking* of a finger over it, to hold the thumb in place during sleep.

As soon as the eight incisors are all in place, procure a soft camel's hair baby-tooth-brush, and begin that regular, systematic care, which alone will preserve them intact.

Brush them, from the gum towards the cutting edge; downward for the upper teeth, and upward for the lower teeth; never brush them in the contrary direction, as that will inevitably crowd the gum back, and expose the neck of the tooth, which is not protected by enamel; and never brush them *crossways*, as it is of no benefit to the teeth, and will not remove the food from the interstices, but rather pack it in.

When the *molars* appear, brush them in the same way, all around the crown; and also rotate the brush on the grinding surface, to clean out the *wrinkles* in the enamel, which is frequently incomplete in the centre, minute fissures sometimes existing which allow acids from decomposing food to penetrate to the dentine and cause decay.

Care should be taken to remove every particle of food from around and between the teeth, every time anything is eaten, by at least thoroughly rinsing the mouth with clear water, to which should be added a little lime-water, if acid fruits, lemonade, etc., have been used.

This affords an argument for regularity in eating, for children who are eating *something*, all day long, will never have clean teeth. The child should also be provided with a tooth-pick (and

taught to keep it always within reach, after solid food is allowed, such as is liable to get wedged in between the teeth). Use also a strand of floss-silk, or a light rubber ring, to pass between the teeth, from the gum down, to dislodge all particles of food.

The teeth should be brushed, as described, the last thing at night, to remove any possible remnants of food, and the first thing in the morning, to remove the deposits from the fluids of the mouth which accumulate during the quiet hours of rest, this accumulation being prevented during the day by the motion of the lips, tongue and cheeks.

The same care and treatment that will preserve the baby's teeth, will also preserve them at all ages; but you must care for your baby's teeth *yourself*, and only very cautiously and gradually entrust this important duty to the child itself, and then, only under your own eye, for a long time, until you are sure that it will be regularly, thoroughly, and systematically attended to.

Especially in *sickness* should the greatest care be taken of the teeth, for then the fluids of the mouth are in an unhealthy condition, and liable to prove injurious to the teeth, they themselves, as integral organs of the human body, participating in the effects of the general disease, suffering from lack of nourishment, and wanting in power of resistance.

The condition of the teeth, after a long illness, usually attributed to *strong medicines*, is very largely due to their neglect at that time.

The *homœopathic* patient is apt to find his teeth in fully as bad a condition as is the *allopathic* sick man, if no precautions are taken in either case.

If the patient is unable to bear a soft brush (and *never* use a hard one under any circumstances), the mouth must be frequently rinsed with clear water, with lime-water, or if the mouth is very foul and the breath offensive, with disinfectants or antiseptics, as, for instance, *listerine*, or *boracic acid* solution. A soft rag wrapped round the finger will do much to remove injurious deposits. If concentrated acids, as *elixir vitriol*, or the *tincture muriate of iron*, are used as medicines, they will only corrode the enamel if *left* in contact with it. A neutralizing mouth-wash, thoroughly used, will be more effective in preventing bad effects than the use of glass tubes, etc., without the wash; though *both* are better than either alone. Where the saliva is acid from disease, *prepared chalk*, rubbed in round the necks of the teeth and between them, and left there through the night, is very beneficial; rinsing with *common salt* and water is also purifying.

Other conditions of the system, giving peculiar odors to the breath, recognizable by the physician or nurse, if not by the patient himself, as that of *ammonia* (to which is attributed white decay, and deposits of *tartar*, and requiring preventive washes of dilute acids, as well as acids internally); or the odor of *sulphuretted hydrogen* (supposed to be

a symptom of causes which produce black decay, and demanding washes of *chlorate of potash*, or of *salycilic acid*), come within the province of the *physician*, who should be familiar with these signs and consider the effects of both disease and medicines upon *the teeth*, as well as upon the other organs of the body, and warn both patients and parents how to prevent the ravages which the *dentist* will otherwise have to repair.

LETTER X.

WEANING. INFANT'S FOOD.

There is one important point that we have not considered, in connection with the eruption of the baby-teeth, and that is: *What food* is best suited to the infant's stomach, during the transition from mother's milk to a regular diet of solid food?

The first of all foods is, of course, *milk*. It has been ascertained, by chemical experiment, that the difference between pure, unadulterated cow's milk and the milk of the human mother lies mainly in the larger proportion of *sugar* in the latter, and the smaller proportion of *caseine*, cow's milk forming a more tough and indigestible curd. The most eminent of the more recent authorities on the subject of Infant Diet, however, authorize the free use of cow's milk, if it can be made a matter of certainty that it is pure and unadulterated.

Milk from the Jersey and Alderney breeds is too rich in cream for the infant stomach, the Ayrshire and grade cows furnishing a fluid more nearly resembling human milk. Milk for an infant should be always from the same cow, which should be young and healthy, supplied with plenty of good pasturage, and sweet clean feed and pure water, and kept quiet and gentle and in good condition. When such milk as this cannot be obtained, and it is rarely possible in large cities (and not always even in the country), Dr. E. N. Chapman, in his valuable work, entitled "*Infant Diet*," says that the nearest approach to the mother's milk, "with the addition of the valuable properties of lime," is prepared as follows:

"Take of condensed milk two teaspoonfuls; water, twenty-four teaspoonfuls; lime-water, four teaspoonfuls; powdered sugar, half a teaspoonful; salt, a small pinch.

"Having brought the water to a blood heat, measure the milk accurately by dipping it out with one spoon and pouring it into another; and having mixed and stirred the several ingredients together, the quantity for one feeding is prepared.

"If milk fresh from the cow be used instead of condensed milk, it should, if to a certainty unadulterated, be diluted in one-half water, and then the lime-water and other ingredients added in the same proportions as before given.

"If a bottle is used, fit it with a black rubber

nipple instead of the poisonous white (which is whitened with arsenic), and draw a half teaspoonful of spirits, diluted with water, through the rubber after each feeding; this prevents fermentation, but the nipple should be renewed frequently, as it is almost impossible to keep it clean and sweet."

Of the different ingredients here combined he says:

"A long series of experiments warrant the following conclusions:

"The constituents of milk are blended together in condensed milk, as when fresh milk has been scalded (*not boiled*).

"Condensed milk, owing to this change, and the removal of a portion of the caseine in the process of condensation, is better adapted to the stomach of an infant than milk fresh from the cow.

"Both plain and condensed milk are, by the addition of a proper proportion of lime-water, closely assimilated to mother's milk, the caseine being held in emulsion until the milk has been intimately mixed with the gastric juice, and then it is precipitated in such a state of minute division as to be readily digested.

"Salt aids in the stability of the emulsion and in the solution of caseine, and in some way, not well understood, promotes digestion, absorption and assimilation. Sugar of milk is also another essential element."

Dr. Chapman is very decided in his opinion of the value of *lime-water*, saying in another place:

"Lime-water and milk is not only food and medicine combined for the infant, but is equally invaluable later in life when the functions of digestion and assimilation have been seriously impaired. A stomach taxed by gluttony, irritated by improper food, inflamed by alcohol, enfeebled by disease, or otherwise unfitted for its duties, as is shown by the various symptoms attendant upon indigestion, dyspepsia, diarrhœa, dysentery and fever, will resume its work, and do it energetically, on an exclusive diet of lime-water and milk. A goblet of cow's milk, to which four tablespoonfuls of lime-water have been added, will agree with any person, however objectionable the plain article may be; will be friendly to the stomach when all other food is oppressive, and will be digested when all else fails to afford nourishment.

"The blood being thin, the nerves weak, the nutrition poor, the secretions defective, and the excretions insufficient, nature here offers a remedy as common as the air, almost as cheap as water. In it all the elements of nutrition are so prepared by nature as to be readily adapted to the infant or the adult stomach, and so freighted with healing virtues as to work a cure when drugs are worse than useless."

Oatmeal furnishes a valuable article of infant diet, prepared as follows: One cup of oatmeal to a quart of water, soaked over night and then boiled until it thickens perceptibly; then strain, sweeten, and

add milk, prepared as above, in equal proportions at first, but gradually reducing the milk, as the babe becomes accustomed to it.

If the child is inclined to constipation, "Nestle's Mother's Milk Substitute — Lacteous Farina" — will be found of inestimable value.

When the baby *wants to bite*, give it oatmeal or Graham crackers, instead of sweet-cakes or fine flour biscuit.

The juice from a tough strip of lean, raw beef-steak, long enough to be held firmly while sucked, is easy of digestion and very nourishing; soup, too, is good, but it should be a clear broth, not too strong, and without vegetables, though it may be whitened with rice, or barley, and strained.

A little later, eggs are suitable; also sweet or Irish potatoes, finely mashed and made of the consistency of cream, with milk and lime-water.

Gradually add other articles of light, easy digestion and good nutritive qualities, including ripe fruits, accustoming it to the solid food necessary for the exercise and strengthening of the teeth themselves after the molars appear.

Do not be anxious to have your baby *too fat*, for *fat* is not always *flesh*. Abnormal fat is as much out of place, and as little to be desired, in a healthy baby, as is a *fat man* or a *fat horse*.

After all the twenty teeth of the first set are in place, govern the diet of your child by the general rules laid down in the preceding chapters for the

regulation of your own diet, and you cannot go astray.

Another important point to be borne in mind with regard to this period of life, is that children require food more frequently than older persons.

At this period of rapid growth and development, all the functions of life — respiration, circulation and digestion — are proportionately rapid, as indicated by the heart-beat and the pulse.

Pereira says: "In children the function of nutrition is more active than in adults. They have not merely to repair the daily waste — that is, to renovate their tissues — but *to grow*. Their functions of circulation and respiration are, therefore, more active than in after life, and they require food — that is, substances to support the process of respiration — to be administered at shorter intervals."

Food containing large proportions of carbon and hydrogen furnish the elements of respiration or serve as "fuel to be burnt in the lungs."

Children therefore require a larger proportion of such food than adults. Arrow-root, tapioca, sago, and other starch-foods, supply the elements of respiration, or fuel for the lungs, *only*, and although important for this purpose, must be supplemented with food containing nitrogen — as milk and the cereal grains, wheat, oatmeal, etc. — to furnish the elements for the growth of bone and muscle. But I have already endeavored to make this plain to

you in a preceding chapter. The same general rules that were laid down for the regulation of your own diet, should govern that of your child.

With systematic diet, regular meals (five a day, gradually reduced to three), fresh air, and suitable dress, the baby, unless exposed to contagious or subject to hereditary diseases, may be kept in health, and the baby-teeth preserved intact, until nature is ready to replace them with the permanent set.

LETTER XI.

WHY THE BABY-TEETH SHOULD BE PRESERVED.

We will now consider why it is a matter of first importance that the baby-teeth — which are all eventually to be replaced by larger, stronger, better ones — should nevertheless be preserved in all their integrity until, having done their duty, nature removes them, one by one (as their successors are ready to come forward), by a most beautiful process — one of the most wonderful in the human economy — namely, the absorption (or gradual wasting away) of the roots. The crowns then detach themselves from the gum and fall from the mouth, having fulfilled their mission without ever having caused a moment's pain or suffering to the happy child where the teeth are naturally of good material and have been properly cared for.

How different is the case with the teeth of those unfortunate children whose mothers, through ignorance or neglect, allow the little pearls to lie embedded in the foul remains of decaying food, corroded by the gases from a stomach overloaded with unsuitable, indigestible, unmasticated food, until they are absolutely eaten away, entailing the most cruel tortures of *toothache*, day after day and night after night, until, amid shrieks of agony, the teeth are extracted.

When the baby-teeth loosen and fall out, in nature's own time, they have no roots left, but when they are extracted prematurely, the roots are long and firmly attached, and in the case of the first molars (so often mistaken for baby-teeth and allowed to decay as such), even larger and more divergent than in the other permanent teeth.

The tooth, being frail from decay, offers no firm hold to the instruments of the dentist, and as it is usually supposed that *anybody can pull a baby-tooth*, the young, tender jaw-bone itself is often injured in these attempts at premature extraction.

The loss to the child of the organs of mastication is also a serious one.

The stomach being overtaxed by unmasticated, indigestible food, the general health must suffer. Assimilation being imperfect, nutrition is impaired, and the growth and development of all the organs checked.

Dr. Thomas Gaddes, editor of the English *Den-*

tal Record, says: "To the child whose diet consists in part of solid food, the temporary teeth are as valuable in preparing that food for digestion as are the permanent ones to the adult. Indeed, it is more important that the child should have the agents necessary for performing well the first part of the digestive process, for if a child — say four years old — be deprived of a few of its organs of mastication, and if it be allowed solid food that it cannot masticate, it is not unfeasible that by the greater excitability of its nervous system in early life, its delicate digestive apparatus should be deranged, and diarrhœa, convulsions, or other reflex disturbances be set up, as well as the nutrition of the child interfered with."

Dr. Gaddes also refers the great loss of infantile life, as recorded in the tables of mortality, to the use of improper food, imperfectly prepared for digestion by defective teeth, or through the want of these organs. He says:

"By so much precisely as the power of mastication is reduced, and its proper performance hindered, by so much will the process of nutrition, and healthy, vigorous, perfect structural formation be impaired, as the ultimate result."

If the decay is allowed to go on until suppuration takes place, and an abscess (or *gum-boil*) is formed, the growing germs of the permanent teeth are liable to be injured (or the growth of the roots entirely checked if they are already well advanced

toward eruption), by the inflammation of the surrounding tissues.

Decay being allowed to reach this point, the "nerve" being destroyed, the *tooth is dead*, and usually no further absorption of the root takes place. It then becomes an obstacle in the way of the new tooth, which is forced to make its way out at some other point, inside or outside of the arch, thus producing irregularity of the permanent teeth.

Another consideration with regard to the decay of the deciduous teeth is the effect of their premature extraction upon the jaw itself, and the spaces to be occupied by the permanent teeth.

After a tooth is extracted, nature has no further use for the empty socket, *as such*, but, as it contains valuable mineral elements, *building materials*, it is soon taken down, as it was built up, cell by cell, and the materials probably taken into the circulation, to be used again in building up other organs requiring the same elements — perhaps even contributing to the growth of the permanent teeth now rapidly advancing.

The teeth being held in their upright position partly by the lateral pressure exerted by one against the other, the bony walls of the socket of the lost tooth having disappeared, the pressure from the remaining teeth upon those adjoining the vacant place meeting with no opposition, gradually crowd them over into this space, which is sometimes thus entirely obliterated.

When this occurs in several different places in the mouth, the consequent contraction of the arch, and loss of space, cannot fail to be disastrous to the regularity of the permanent teeth.

If more teeth are removed from one side than from the other, which is very apt to be the case, the unresisted strain of the powerful muscles on that side of the face will draw even the lips and the nose to one side, producing absolute distortion of the face, and marring its beauty forever.

Even if extraction be equal on both sides, the consequent shrinkage will give an aged look to the young face that is painful and unpleasant.

Thus arguments almost *ad infinitum* can be urged for the care and preservation of the deciduous teeth.

Let the minutest cavity of decay be, therefore, filled promptly, no matter how young your child may be when the little black speck shows itself.

LETTER XII.

FILLING THE BABY'S TEETH.

You will perhaps laugh and think I am joking, if I tell you that one of my own children had a tooth filled before he was a year old! But it is nevertheless a fact. The little fellow was about nine months old when the "upper central incisors" (or first little upper teeth in the centre of

the jaw) came through. I soon noticed that one of them was marred by a little round yellow spot on its front face, near the cutting edge. In a few weeks this formed a cavity of decay. Fearing the toothache for my tender babe, when he was eleven months old I seated myself in the chair of the dentist, with the baby *sound asleep in my arms*. Holding the upper lip out of the way with my finger, with keen instruments all the decayed portions were removed so deftly that the babe never stirred nor woke, and the cavity was filled with "white filling," or cement.

The baby had the whooping-cough, however, at the time, and being seized with a paroxysm during the operation, the filling got wet before it had time to harden, and did not prove durable.

At the age of thirteen months the tooth was therefore filled again, this time with white alloy, the baby being wide awake and sitting alone in the big chair (with a little chair in it) apparently enjoying the honor conferred upon him, and occasionally demanding to "thpit," as he had seen done by the preceding patient.

This preserved the tooth until the age of three years, when the tooth having worn down from the edge, the filling fell out. The cavity being white and clean, no further decay having taken place, it was again filled, this time with gold, which preserved it perfectly until it fell from the gums at the proper time, with the root well absorbed.

As illustrating the effect that injuries to the first teeth may have upon the second, I will add that the permanent tooth which replaced that defective one has a similar but white spot upon it, which, however, shows no tendency to decay, and is the *only blemish* in the otherwise perfect full set of teeth of a boy now (1883) fifteen years old, and in whose case the system laid down in these letters has been fully carried out.

Therefore, I say again, carry your child early to the dentist, that the very first symptoms of decay may be detected and checked. It will not do to rely upon your own judgment as to the real condition of the teeth.

Notwithstanding all your care, decay is so insidious, and due to so many remote and perhaps hereditary causes, that it may obtain a foothold all unsuspected by you, to be discovered only by the trained eye and delicate touch of the instrument of the skilled dentist.

The integrity and regularity of the second set, as well as the health of your child, depends so much upon the condition of the first set, that there should be no guess-work about the latter.

Take your child, therefore, regularly to the dentist every few months after it has a mouthful of teeth. Have a clear understanding with him from the beginning, that those teeth are to be henceforth under his special charge; that, feeling your need of his advice and co-operation in their care, you intend conscientiously to second his efforts for their

preservation, and that you share with him the responsibility of their integrity. With such an understanding, the charges for mere examination at regular intervals will be but light; and there will rarely be any necessity for anything else, in a large majority of cases, if the precepts herein laid down are faithfully followed out.

Dr. Homer Judd sums up the reasons for all this care of the baby-teeth as follows:

1st. Because they are needed for daily use.

2d. Because it will prevent a great amount of pain and sickness.

3d. Because by these means the nutritive process will be carried on better, and as a consequence, the health, growth and development of children will be better than would be the case if these organs were prematurely lost, and a better development of all parts will be thus attained; and

4th. As the regularity of the permanent teeth depends very much upon the proper development of the maxillary bones, we have no doubt but that the proper care and retention of the deciduous set will exert a salutary influence upon the former.

LETTER XIII.

ERUPTION OF THE PERMANENT TEETH.

When your baby's first *big jaw teeth* came in, at the age of perhaps twelve months, they were apparently as far back in the little jaw as a tooth

could well be placed; yet, as the child entered its third year, you found there was then ample space for still another big tooth back of the first, the jaw having evidently *lengthened out* to the rear, the front teeth still having their old fixed places and relative positions.

Caring for your child's teeth yourself, as I am confident you will do, you will note all the changes that occur from time to time, and consequently will find that the jaw continues to *make space* back of the teeth, until, at about the age of six years, still another new tooth will make its appearance beyond the two baby molars which have been doing good service for three or four years.

You will not be liable to suppose, as does many a more ignorant mother, that there are *three jaw teeth* in the baby set (and their decay immaterial, because they are all to be replaced). *You* will know that it *cannot* belong to the baby set of twenty teeth, and also that merely *replacing* this latter number will not afford the thirty-two which make up the permanent set, even the addition of the four "wisdom teeth," with which all are familiar, making but twenty-four. When, where and how do the eight others come?

This new tooth, coming in at about the age of six years, is the first molar (or jaw-tooth) of *the permanent set*, frequently called the "sixth-year molar," from the age at which they make their appearance.

Dr. Welchens calls these teeth the "corner-stones of the arches, the outposts and main supports of the whole process of second dentition."

These teeth are of special importance, for several reasons: In the first place, they are ready for service while the baby teeth are being lost and replaced; and in the second place, they are the largest teeth in the permanent set and in the centre of the arch, therefore the principal ones in the whole wall. They are also exactly opposite the *duct* (or aperture) which furnishes the largest portion of saliva, for the preparation of food for digestion.

As, for some as yet not well understood cause, they are more liable to early decay than any of the later teeth, they must receive special care and attention; and on the first slight appearance of decay be promptly filled, and, if necessary, *refilled*.

Dr. Wm. H. Dwinelle speaks of these teeth as being "the largest of all the molars, and appointed to the post of honor of bridging over the critical and dangerous gulf between youth and maturity; and as making normal mastication possible while the temporary teeth pass away and are succeeded by the permanent ones."

Watch for these sixth-year molars, then, and give them your most careful attention. They are liable to be less dense than the other teeth, and may require filling and refilling, but they are of sufficient importance to justify it, for with proper care and suitable diet they will improve in texture as they grow older.

After these four teeth have come into place, the little "front teeth" soon loosen and fall out, one after the other.

The baby teeth are exchanged for new ones in about the same order that they erupted, but in about twice the length of time.

This *replacement* is preceded, as we have seen, by the eruption of these "sixth-year" or first four permanent molars (or jaw-teeth) and followed, at about the age of from eleven to thirteen by four others, still further back, as the jaw has again extended in length — the latter being known as the "twelfth-year" or second permanent molars. The six years intervening between the eruption of these additional eight jaw-teeth are occupied in exchanging the twenty baby teeth for twenty permanent ones — none of the *replacing* teeth being double teeth or molars.

The eight incisors (or central front teeth) should all be exchanged for similar but larger and stronger ones, by the time the child is nine years old.

Then — passing over the canines (stomach and eye-teeth) as was the case with their eruption, the eight baby molars are exchanged — not for new molars, but for another class of teeth, not found in the first set, called *bicuspids*, from their form (*a cusp* being a point or prominence) — the eye-teeth for instance, having one cusp, and the bicuspids two.

These bicuspids, being small *half-double* teeth,

are not infrequently pointed out to the dentist by would-be-wise patients as evidence of not having yet shed all the baby teeth!

The eight bicuspids being usually in place at about the age of twelve years, the canines (or stomach and eye-teeth) are next replaced by others of the same shape, but larger and stronger; the twelfth-year molars make their appearance (sometimes before or while the canines are being exchanged), the eruption of the third molars (or wisdom-teeth) completing the full adult set of thirty-two teeth, without which no mouth is in perfect condition to provide for all the wants of the system. The eruption of the wisdom-teeth varies from the ages of fifteen to fifty years of age; and they are sometimes the cause of severe suffering, from not having sufficient room developed in the jaw for their occupation, the jaws and teeth not having been properly exercised in mastication.

An Arab proverb reads: "He who does not masticate well is an enemy to his own life."

No arguments for the care and preservation of the permanent teeth need be adduced beyond those already given in regard to the temporary ones.

"Their preservation and usefulness for speech and mastication till advanced life; the favorable impression made upon the general health by the ability thoroughly to masticate the food; the comfort of a pure breath and wholesome saliva; and the agreeable effect produced upon others by the

exhibition of a clean and healthy mouth, are surely reasons enough to induce all to pay that attention to them upon which their appearance, preservation and usefulness depend."

The suffering in masticating food with sensitive or aching teeth, or the inconvenience when a number of them is lost, "can only be properly appreciated by those who have been unfortunate enough to have had some experience in this direction." Speaking with distinctness and comfort depends much upon a full and even set of teeth. If they are crowded and irregular, or if there is now and then one missing, it affects the voice at once, and is very annoying to others who are obliged to listen to it. Public speakers often fail to produce the effect they desire upon their hearers, from this cause, and are not conscious of it themselves.

Nothing contributes more to the beauty of the features than a perfect, regular, clean set of teeth, while a neglected, filthy, diseased mouth is painful to all beholders.

The opinion is held by those who have given this subject the closest study, that "upon an average, life is shortened one year for each tooth lost. If this is true, as it must be to a great extent, how important the preservation of every tooth in a healthy and working condition! The hygienic care of the teeth is so *understandable* and simple, that no one is excusable for not carrying out its indications most perfectly.

"When disease has attacked the *teeth*, usually

but little or no concern is manifested about it. If the *eye* or the *ear* becomes diseased, the utmost solicitude is at once manifested, and no effort for restoration is left untried. Time, money, and the highest skill are all called into requisition — and used lavishly, too, if a cure can but be obtained — and yet the loss of an eye or an ear, usually, will not affect *the system* at all. But the teeth may become diseased and the patient suffer for months and years, and even sicken and die, without any one considering that disease of the teeth could exercise any influence beyond the cavity of the mouth, while the truth is, when the teeth are diseased, every organ and every fibre in the body suffers as a consequence."

It is said on the authority of the last United States census, that but one person in eighty has sound teeth. It is also said by those who have made a study of these things, that one hundred years ago one person in every twenty-five had perfect teeth, while two hundred years ago the proportion was one in every five!

What a comment upon the civilization of the nineteenth century of enlightenment and culture!

LETTER XIV.

CAUSES OF DECAY. PREVENTION.

And now a few words as to the better understood and more avoidable *causes* of the decay of the teeth, and the possibilities of its prevention.

Dr. Marvin, of Brooklyn, N.Y., says:

"Purely preventive treatment must begin far back, antedating birth, conception, marriage. In the girlhood of the yet future mother, the instructions should be given, which, if followed, will secure uniform physical development, perfect nervous balance, a healthy circulation, good digestion — in a word, robust health. This is the time for, and this *is* preventive treatment. It consists of nutritious diet, regularity of habits, exercise in the open air — (such exercise as employs all the machinery of the human frame, as walking, horseback riding, rowing); a style of dress which does not hinder the free action of the internal organs, which does not distort the body nor weigh unduly upon the abdomen, nor overclothe one part, leaving another unprotected; regular and consistent habits of thought; the cultivation of equability of temper and sufficient sleep at the proper hours of sleep.

"Such habits of life, many of which I know are not *fashionable*, will prepare a woman to transmit to the children she may bring into the world, an inheritance of incalculable value and permanent duration."

This is but another way of saying what I have been urging upon you from the very first of these letters; for what will give robust health will make good teeth, and will maintain good teeth.

You ask, then, why do the teeth decay?

First, we will look at the natural surroundings of the teeth.

They are constantly bathed in the fluid secretions of the mouth; they are implanted in a fibrous tissue covered with a membrane which secretes large quantities of mucus; and they are kept constantly at a comparatively high temperature.

You know that when acids, such as lemon-juice, vinegar, or strong medicines, are accidentaly spilled upon the marble top of your sideboard, wash-stand or bureau, that it is permanently injured, if they are allowed to remain there; the fine gloss is destroyed, the surface roughened, and if a round drop stands long, a little pit is formed.

Now, marble is one example of *lime* formation, and your teeth another. All *acid* foods, fruits, drinks, medicines, tooth-washes or powders, are therefore injurious to the teeth if allowed to remain about them.

"Most people have experienced what is commonly called teeth set on edge. The explanation of it is, the acid of the fruit that has been eaten has so far softened the enamel of the tooth that the least pressure is felt by the tiny nerve fibrils pervading the bony part of the tooth. Such an effect cannot be produced without injuring the enamel. True, it will become hard again, when the acid has been removed by the fluids of the mouth, just as an egg-shell that has been softened in this way becomes hard again by being put in water. When the effect of sour fruit on the teeth subsides, they *feel* as well as ever, but they are not as well. And the

oftener it is repeated, the sooner the disastrous consequences will be manifested."

Therefore, rinse your teeth promptly and thoroughly with an alkaline wash (simple lime-water is good), to neutralize all such acids; and your teeth will not decay from *this* cause.

Food of any kind, if allowed to accumulate around and between the teeth, will, in the natural high temperature of the mouth, *ferment* and generate acids, which will cause the teeth to decay:

Therefore, keep your teeth scrupulously clean and free from all particles of food, and they will not decay from *this* cause.

Cracking nuts and *biting threads* will fracture the enamel and allow acids to penetrate to the dentine, inducing rapid decay; also allowing ingress to the *germs*, *bacteria*, and what not, which are supposed to run riot in the animal tissues of the teeth:

Therefore, do not crack nuts or bite threads with your teeth, and they will not decay from *this* cause.

Very *hot drinks* or very *cold drinks* will have the same effect upon the enamel of your teeth that the same sudden changes of temperature would have upon a fine glass goblet:

Therefore, do not expose your teeth to these changes of temperature (as, for instance, a cup of very hot tea or coffee, followed by a glass of ice-water), and your teeth will not decay from *this* cause.

Dr. Richardson (of the Odontological Society of Great Britain) thinks that one of the most efficient causes of the decay of the teeth is found "in that form of dyspepsia induced in early life by improper feeding, especially in the substitution of artificial foods for the natural breast milk. . . . the child being deprived of its natural and admirably adapted food, and supplied with nourishment which its stomach could not digest, nor its body assimilate, its tissues, generally, were imperfectly constructed, and although it might retrieve in after-life some of the harm which had been inflicted, in the case of tissues which are constantly undergoing reconstruction, in the case of such dense structures as the teeth, perfection was impossible if the start was bad."

Another very frequent cause of decay and irregularity of the teeth lies in the inheritance of incongruous jaws and teeth from the two parents. The *father* having large teeth in a corresponding jaw, and the *mother* small teeth in a small jaw, though both may have perfect sets of teeth, the inheritance may nevertheless be most unfortunate for the children. The *teeth* being as a rule inherited from the *father* (Drs. Winder and Coy say eight times out of ten), and the bones — including, of course, the jaw — from the mother, the large teeth of the one being crowded into the small jaw of the other, the teeth of the children will probably be irregular and overlapping, and cleanliness consequently next to impossible.

But these things are rarely taken into consideration when young people *fall in love* and marry, and a *little rosebud mouth* is *so lovely* in a woman's face!

Reverse the case, and let the father have small teeth, and the mother a large jaw, and the happiest results may be expected in the next generation. And this about exhausts the list of the more ordinary causes of decayed teeth.

There are others, attributable to *hereditary* and *transmittible* diseases, which are beyond control, as society now exists. This may appear a very delicate subject to touch upon, but it is nevertheless a fact that, until the *culture* of the human race is made a matter of as much consideration as the raising of fine poultry or live-stock, men and women, who have no *moral right* to bring into the world children to inherit and perpetuate disease and suffering, will marry and transmit the curse of hereditary and incurable disease to countless generations yet to come.

And teeth will continue to decay, from *this cause*, so long as these things are not understood and made a matter of serious consideration, *before marriage.*

LETTER XV.

DISEASES OF THE SOFT TISSUES OF THE MOUTH.

There are some diseases of the soft tissues of the mouth (or rather of the gums) which require brief mention, in connection with this subject, especially those which result from lack of proper care of the teeth.

In their healthy condition the gums are firm and tough, forming regular *festoons* around and between the teeth; their color is even and fine, and not too high; their nerves are not sensitive, and their slightly *acid* secretions are neutralized by the *alkaline* saliva. When diseased, the tissue becomes soft and flabby; the color denotes inflammation, and they bleed at the slightest touch, or pus (or matter) is discharged from around the necks of the teeth; their nerves become acutely sensitive; the secretions abnormally acid, causing sensitive grooves around the necks of the teeth, which may eventually decay. The breath is also rendered foul and offensive, sending poisonous effluvia to the lungs, and poisoning the blood.

The *causes* of this diseased condition of the gums are various, but all are traceable to the same general source — namely, neglect of the teeth, and *ignorance* of the consequences.

Particles of food, crowded down under the edges of the gum, generate acids and cause irritation and inflammation.

The saliva deposits more or less *tartar* upon the teeth; soft and pasty, and small in quantity at first, and easily removed by the brush; but if allowed to accumulate, increasing rapidly — like attracting like — and becoming hard and gritty, working its way under the gums down the roots of the teeth, it loosens them, sometimes detaching them entirely and causing them to fall, whole and undecayed, from their sockets.

The only treatment for this is — *prevent it* in the first place, by absolute cleanliness of the teeth, and have it removed by the dentist with proper *instruments* if you have allowed it to accumulate.

All *washes* or other preparations, advertised as being able to *dissolve* the tartar, will also dissolve the enamel of the tooth itself.

The same may be said of the removal of *green* or *brown* discolorations or stains, seen around the necks of the teeth of both children and adults.

Gum-boils are the result of the decomposition of a dead pulp (or nerve) of the tooth preceded by decay. They are prevented by preventing decay, and cured by proper treatment of the tooth by the dentist.

Swelled face results from the same cause, and requires the same treatment.

Never poultice or make hot applications of any kind *on the outside*, or a disfiguring *scar* may be the result. Reduce the inflammation by *cold applications* externally, and apply a hot roasted raisin

or fig on the inside (the proper spot will indicate itself), *and see your dentist.*

In the care of the teeth as well as of the general health, too much importance cannot be attached to *lime-water*, as I said before.

A pitcher appropriated solely to its preparation, should be found in every household, and a bottle of clear lime-water should have a place on the sideboard, and on every wash-stand in the house.

It is always ready, and requires no preparation, as is the case with carbonate of soda and other alkaline preparations. It is equally invaluable to both adult and infant.

If the mouth be well rinsed with lime-water after every meal, and especially after eating any acid fruit, or drinking lemonade, and also just before retiring at night, a large proportion of the teeth that, without this simple precaution, would decay, may be kept sound, without any further care or expense than the use of the brush and tooth-pick.

The toothache of pregnancy may frequently be relieved by this simple remedy.

A spoonful, in a little clear water, swallowed on the first symptoms of indigestion (such as a feeling of fulness, acid risings in the throat, etc.) will often act like a charm in preventing any further indisposition.

Added to the milk fed to an infant, it prevents the formation of tough curds and renders the milk more easily digestible.

The vomiting and diarrhœa of an infant may also often be checked by the frequent administration of a teaspoonful of lime-water in three or four of water or milk.

But especially in the care of the teeth it is invaluable as a prophylactic, or preventive of decay.

And now, my dear young friend, a brief enumeration in my next letter, of a few of the diseases which may fairly be attributed to *decayed teeth* as their first cause, must bring to a close this already too lengthy correspondence.

Under the stimulus of your appreciative replies, and your repeated requests for still further information, it has grown into almost a *scientific dissertation*, far beyond its original design.

LETTER XVI.

DISEASES RESULTING FROM DECAYED TEETH.

The tooth is an integral part of the human body — "nourished by the same aliments, vitalized by the same blood, pervaded by the same nerves" — as the heart, the lungs or the brain.

The stomach is the great laboratory of the human system. Dr. Edward Nelson says: "For the proper performance of its functions, it should be in a healthy condition; but this may be seriously deranged and the whole economy thrown into disorder, and even fatal consequences result from intense

pain, as it shoots and vibrates along the nerves from the swollen and inflamed pulp of a single tooth."

The first and inevitable effect of decayed teeth upon the general health is *indigestion* from insufficient mastication, and the swallowing of the vitiated fluids of the mouth.

The digestive organs ceasing to do their duty, "the blood becomes vitiated, and the whole organism becomes enfeebled, with its attendant gradual wasting away and loss of vital power."

Frequent indigestions result in chronic *dyspepsia*, *gastritis*, *enteritis* and *death*.

Neuralgia in connection with decayed teeth is too common to need mention. Another consideration is that even the extraction of decayed teeth becomes a fresh cause of neuralgia, thus affording a double reason against allowing the teeth to decay.

The effluvia from decayed teeth poisons the breath, and entering the lungs becomes a potent factor in the causes of *consumption*.

The discharging pus from diseased gums and decayed teeth poisons the secretions and the blood, resulting in *septicemia* or blood poisoning.

The lamented Dr. J. Marion Sims, of New York, says: "Decayed teeth, with matter exuding from around the teeth, are the means of producing more *nervous disorders*, more terrible consequences to the general health than almost any other thing that can happen. . . . It is a matter of regret that

medical men generally have so little knowledge on this subject."

Dr. N. E. Hollace, of Boston, also says: "The bad effects of a diseased and unclean mouth upon the general health are of a more serious consequence than most physicians are aware. In twenty-four hours we breathe twenty thousand times, and what must be the effect upon the delicate structure of the lungs when, for days, months and years, the air we breathe is drawn through a depository of filth, and is poisoned by being mixed with effluvia arising from decayed teeth and ulcerated gums."

An English physician relates the case of a gentleman, pronounced by one of the highest medical authorities of the day to be afflicted with *cancer of the stomach*, twenty years ago, to whom it was proposed to have his decayed teeth removed, and an artificial set inserted. He says: "This proposal seemed almost a mockery to a man who had just been assured that he was gradually sinking from an inevitably fatal malady, but it was acted upon, with the result that the patient soon regained his digestive power, and is alive at the present day, a fairly vigorous man of eighty years of age."

Dr. Winston, of Nashville, says: "I once saw a *cancer* which had resisted all treatment of physician and charlatan — a *dentist* cured it in five minutes. I saw a woman wasting under *consumption*, and regarded as doomed to die. Her *teeth* were extracted, and now she walks the streets of Nash-

ville with as blithe a step and as agile as any young lady in the city."

Dr. Peetz, of Merseberg, Germany, relates the case of a working woman with *paralysis* of the left side. She having stated that the paralysis came on after an attack of acute pain in a certain tooth, the tooth being extracted, the paralysis was cured and never again recurred.

Dr. Samuel Sexton, who has been engaged in an investigation of the teeth of school children, with special reference to the influence of decayed teeth upon the *sight* and *hearing*, testifies that he has found an almost constant association between near-sightedness, impaired hearing, *and decayed teeth*.

He has also found them responsible for deep-seated cerebral trouble, *progressive dementia* (or insanity) having been arrested "by repairs on the teeth."

Dr. Barnett, also, says: "It has long been known and recorded in medical literature that a peculiar sympathy exists between the ear and the teeth," while Dr. Edward Woakes, in his work on deafness, etc., traces this same connection through "the clear channel of nerve communication."

Dr. Koch, of Chicago, says: "*Insanity* has been cured by the extraction of carious teeth."

Dr. Savage relates the case of a man who was more or less insane for six months, being sometimes quite dangerous, during the six months of

his insanity. As he was also suffering from tooth-ache, some decayed teeth were extracted and there was no return of the insanity."

A case is also cited by the celebrated French Professor Velpeau, of a case of mental derangement in a lady, which was cured by the simple lancing of the gum, liberating a wisdom-tooth.

Dr. Nelson, of Frederick, Md., says: "Dyspepsia, phthisis pulmonalis, neuralgia, epilepsy, rheumatism, affections of the ear and eye, and even insanity, have each and all had their origin in a carious tooth."

Pages could be filled with similar statements, but surely enough has been said to show that the *tooth-ache*, excruciating as are its agonies, forms but a minor part of the evils resulting from decayed teeth, though, as Dr. Hollace says, mere "*pain* itself is fully capable of deranging the whole economy, and inducing serious and fatal disorder."

There is another point to be considered:

Though *health* is of the first and prime importance, *beauty* is a matter of no small consideration.

A prime factor in beauty, and the most expressive feature of the human countenance is *the mouth*, and the expression of the mouth depends largely upon the teeth. "In vain will the eyes sparkle with joy and delight, if the lips are compressed to hide a mouth full of defective teeth. The whole countenance, beaming with brightness, loses half its charm by the exhibition of a foul and

unsightly denture. Half the charms of real culture are lost when expressed through an unsightly denture, and the expression of sorrow and grief is made hideous by the exhibition of this living tomb of decay."

CONCLUSION.

In conclusion, I will give you only one single case, though numerous others might be cited, in illustration of what can be, and has been, accomplished by carefully and thoroughly following out such a system as that indicated in the preceding pages — the history of a family of five children, as narrated to me by their dentist (who was also their father).

There was every reason to anticipate *poor teeth* for them, for, on the *paternal* side, though the grandfather had fair average teeth, he lost them all before the age of fifty, while the grandmother lost all of hers before the age of thirty. The father, appreciating the value of his teeth, kept them in good condition by the most watchful care, but has numerous large fillings. Of his two sisters (he had no brothers), one wears an artificial denture; the other — much younger — has most of her own teeth yet, but they are very frail, and consist more of filling-material than tooth-substance.

On the *maternal* side, the grandfather was toothless from the earliest recollection of his children,

and the grandmother lost all of her teeth before the birth of any of the grandchildren to be mentioned. The mother wore a full upper and lower set before the conception of her first child; her oldest sister wore six upper front teeth on pivots before the age of fourteen, and a full set before she was twenty; the second has very frail teeth, and only retains them by the greatest care, all of them having fillings; the third has but a few ragged remnants of teeth left, and only waits for courage to have them extracted to wear a full set. No brothers.

Knowing all this, and having given the subject much study, the father early endeavored to impress upon his wife his views of her responsibility in the matter.

He laid before her a theory of tooth-culture by tooth-nutrition, and prescribed the diet and "drugs" by which he hoped to provide suitable nutritive elements, first to the embryo through the mother's nutrition, second to the babe through her milk, and third to the babe itself in its diet, exercise, etc.

But she responded but poorly to his efforts in the case of the first child. The prescribed diet was distasteful, with its brown bread, oatmeal porridge, etc.; the lime-water and other prescriptions were unpalatable; in short, to use her own words, "other people's children had teeth, and she supposed hers would, too, and she was not going to subject herself to any such vagaries in support of mere scientific theories."

Being young and self-willed, and not long married, she had things pretty much her own way; but she had the mortification of finding that her baby had soft, chalky, defective teeth, which before its third birthday had already received thirteen fillings, besides which it early suffered the loss of a lower molar, thereby, to a critical eye, marring the perfect symmetry of the features.

Concluding that it might perhaps be wiser to test the matter, radical changes were made in the diet and habits of the first child, and the mother adopted the prescribed *regime*, partially for the second child, and pretty fully for the three which followed. Bearing children rapidly, the first child being but little over four years old when the fourth was born, she was, however, unable to give that close personal attention to their teeth necessary to the absolute perfection of cleanliness.

Necessarily left much to the ministrations of ignorant and careless servants, their sixth-year molars were neglected, while their diet, dress and exercise were often the very contrary to what they should have been, although the father, of course, gave them all the attention possible, in the little time that could be spared from his professional duties and the care of an invalid wife.

But with all these drawbacks, let us see the results of even the partial following out of the theory of *embryonic and infantile dental nutrition*:

The oldest child had the soft, chalky *baby-teeth* so hardened and reconstructed as to require no further fillings after the thirteen put in before the third birthday, as already stated, and now, at the age of seventeen, with the exception of a slight irregularity resulting from the unfortunate early loss of the deciduous lower molar, as stated, has a perfect set of teeth, of fine structure and quality, with only very small fissure-fillings in two of the sixth-year molars, which, in consequence of inherited defective fissures, required attention within a few months of their eruption; all of her teeth are otherwise intact.

The second child, a boy of nearly fifteen, has as even and sound a set of teeth as can be found anywhere.

The third, a girl of thirteen, has beautifully regular, sound and perfect teeth.

The fourth child, as far as the permanent teeth have erupted, with the exception of the same slight fissure-fillings, has absolutely no imperfection whatever in her teeth, either in size, color, quality or position.

It is too early yet to pronounce judgment upon the permanent teeth of the fifth child, as he is but seven years old; but as his deciduous teeth have remained intact with the exception of minute approximal fillings in the upper central incisors, which are now replaced by permanent teeth of fine quality, and as his sixth-year molars are of good

texture, I think it is fairly proved by this case alone, even were there no others on record, that, by a judicious system of diet, selecting such articles of food as offer the greatest abundance of mineral elements; by keeping the system in such a condition of general good health by bathing, exercise, fresh air, etc., that these elements will be assimilated and appropriated by the organs which specially require them, coming generations may be provided with *strong*, *sound teeth*.

If such a system could be universally adopted, disease would be practically banished from the world.

Strong, hearty, well nourished and well developed men and women would replace the pale, puny, half-starved invalids who now form such a large proportion of our population.

MOTHERS! to you is committed the responsibility of *beginning* this great work. In the words of another: "Important as it is in reference to the present, its magnitude awes us when we consider it with relation to the millions yet to come."